



Microsoft Office Virtual Learning

Intro to Formulas

May 11, 2020



Lesson: May 11, 2020

Objective/Learning Target:

Students will learn how to create and apply formulas in Excel and Google Sheets



Introduction

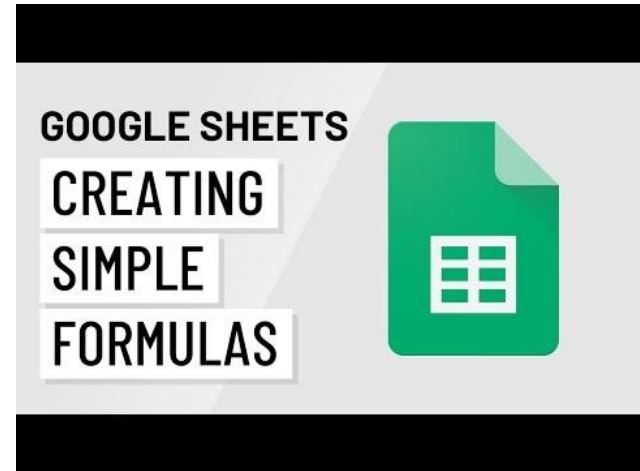
One of the most powerful features in Excel and Google Sheets is the ability to **calculate** numerical information using **formulas**. Just like a calculator, Excel and Google Sheets can add, subtract, multiply, and divide. In this lesson, we'll show you how to use **cell references** to create simple formulas.

Excel



<https://youtu.be/xc14gFFyiTw>

Google Sheets



<https://youtu.be/llkP9DxRAPI>



Mathematical Operators

Google Sheets and Excel use standard operators for formulas: a **plus sign** for addition (+), **minus sign** for subtraction (-), **asterisk** for multiplication (*), **forward slash** for division (/), and **caret** (^) for exponents.

Addition	+
Subtraction	-
Multiplication	*
Division	/
Exponents	^

All formulas in Excel and Google Sheets must begin with an **equals sign** (=). This is because the cell contains, or is equal to, the formula and the value it calculates.



Understanding Cell References

While you can create simple formulas in Excel and Google Sheets, using numbers (for example, **=2+2** or **=5*5**), most of the time you will use **cell addresses** to create a formula. This is known as making a **cell reference**. Using cell references will ensure that your formulas are always accurate because you can change the value of referenced cells without having to rewrite the formula.

By combining a mathematical operator with cell references, you can create a variety of simple formulas in Excel. Formulas can also include a combination of cell references and numbers, as in the examples below:

=A1+A2	Adds cells A1 and A2
=C4-3	Subtracts 3 from cell C4
=E7/J4	Divides cell E7 by J4
=N10*1.05	Multiplies cell N10 by 1.05
=R5^2	Finds the square of cell R5

Understanding Cell References

In the formula below, cell A3 adds the values of cells A1 and A2 by making cell references:

	A	B
1	5	
2	2	
3	=A1+A2	
4		

	A	B
1	7	
2	3	
3	=A1+A2	
4		

When you press Enter, the formula calculates and displays the answer in cell A3:

	A	B
1	5	
2	2	
3	7	
4		

	A	B
1	7	
2	3	
3	10	
4		

If the values in the referenced cells change, the formula automatically recalculates:

	A	B
1	6	
2	2	
3	8	
4		

	A	B
1	8	
2	3	
3	11	
4		

Creating Formulas

Excel

- Select the cell that will contain the formula.
- Type the equals sign (=). Notice how it appears in both the cell and the formula bar.
- Type the cell address of the cell you want to reference first in the formula: cell D10 in our example. A blue border will appear around the referenced cell.
- Type the mathematical operator you want to use. In our example, we'll type the addition sign (+).
- Type the cell address of the cell you want to reference second in the formula: cell D11 in our example. A red border will appear around the referenced cell.
- Press Enter on your keyboard. The formula will be calculated, and the value will be displayed in the cell. If you select the cell again, notice that the cell displays the result, while the formula bar displays the formula.

QUANTITY	PRICE PER UNIT	LINE TOTAL
15	\$8.75	
18	\$2.59	
9	\$14.25	
12	\$2.99	
JUNE BUDGET		\$1,200
JULY BUDGET		\$1,500
TOTAL		=D10

QUANTITY	PRICE PER UNIT	LINE TOTAL
15	\$8.75	
18	\$2.59	
9	\$14.25	
12	\$2.99	
JUNE BUDGET		\$1,200
JULY BUDGET		\$1,500
TOTAL		=D10+D11

QUANTITY	PRICE PER UNIT	LINE TOTAL
15	\$8.75	
18	\$2.59	
9	\$14.25	
12	\$2.99	
JUNE BUDGET		\$1,200
JULY BUDGET		\$1,500
TOTAL		\$2,700

Google Sheets

- Select the cell that will display the calculated value.
- Type the equals sign (=).
- Type the cell address of the cell you want to reference first in the formula. A dotted border will appear around the cell being referenced.

JUNE BUDGET	\$1,200
JULY BUDGET	\$1,500
TOTAL	=D10

- Type the operator you want to use. For example, type the addition sign (+).
- Type the cell address of the cell you want to reference second in the formula.

JUNE BUDGET	\$1,200
JULY BUDGET	\$1,500
TOTAL	=D10+D11

- Press the Enter key on your keyboard. The formula calculates, and Google Sheets displays the result.

Modifying Values with Cell References

The true advantage of cell references is that they allow you to **update data** in your worksheet without having to rewrite formulas. In the example below, we've modified the value of cell D10 from \$1,200 to \$1,800. The formula in D12 will automatically recalculate and display the new value in cell D12.

The screenshot shows an Excel spreadsheet with a formula bar at the top displaying "=D10+D11". The spreadsheet has three rows and two columns. Column C contains budget categories, and column D contains monetary values. Row 10 is highlighted in light blue, row 11 in light green, and row 12 in light orange. The formula bar shows the formula in cell D12 is "=D10+D11".

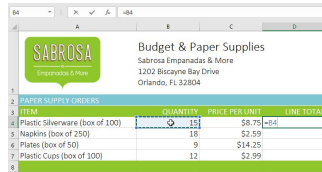
	C	D
10	JUNE BUDGET	\$1,800
11	JULY BUDGET	\$1,500
12	TOTAL	\$3,300

Create Formulas Using Point and Click Method

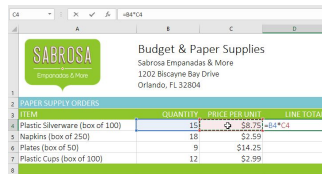
Excel

Rather than type cell addresses, you can point and click the cells you want to include in your formula.

1. Select the cell that will contain the formula
2. Type the equals sign (=).
3. Select the cell you want to reference first in the formula: cell B4 in our example. The cell address will appear in the formula.
4. Type the mathematical operator you want to use. In our example, we'll type the multiplication sign (*).
5. Select the cell you want to reference second in the formula: cell C4 in our example. The cell address will appear in the formula.
6. Press Enter on your keyboard. The formula will be calculated, and the value will be displayed in the cell.



ITEM	QUANTITY	PRICE PER UNIT	LINE TOTAL
Plastic Silverware (box of 100)	15	\$8.75	\$131.25
Napkins (box of 250)	18	\$2.59	\$46.62
Plates (box of 50)	9	\$14.25	\$128.25
Plastic Cups (box of 100)	12	\$2.99	\$35.88



ITEM	QUANTITY	PRICE PER UNIT	LINE TOTAL
Plastic Silverware (box of 100)	15	\$8.75	\$131.25
Napkins (box of 250)	18	\$2.59	\$46.62
Plates (box of 50)	9	\$14.25	\$128.25
Plastic Cups (box of 100)	12	\$2.99	\$35.88

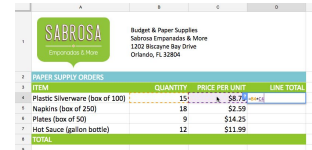
Sheets

Rather than type cell addresses, you can point and click the cells you want to include in your formula.

1. Select the cell that will display the calculated value.
2. Type the equals sign (=).
3. Click the cell you want to reference first in the formula. The address of the cell appears in the formula.
4. Type the operator you want to use in the formula. For example, type the multiplication sign (*).
5. Click the cell you want to reference second in the formula. The address of the cell appears in the formula.
6. Press the Enter key on your keyboard. The formula will be calculated, and the value will appear in the cell.



ITEM	QUANTITY	PRICE PER UNIT	LINE TOTAL
Plastic Silverware (box of 100)	15	\$8.75	\$131.25
Napkins (box of 250)	18	\$2.59	\$46.62
Plates (box of 50)	9	\$14.25	\$128.25
Hot Sauce (gallon bottle)	12	\$11.99	\$143.88



ITEM	QUANTITY	PRICE PER UNIT	LINE TOTAL
Plastic Silverware (box of 100)	15	\$8.75	\$131.25
Napkins (box of 250)	18	\$2.59	\$46.62
Plates (box of 50)	9	\$14.25	\$128.25
Hot Sauce (gallon bottle)	12	\$11.99	\$143.88

Copying Formulas with the Fill Handle

Formulas can also be copied to adjacent cells with the fill handle, which can save a lot of time and effort if you need to perform the same calculation multiple times in a worksheet. The fill handle is the small square at the bottom-right corner of the selected cell(s).

1. Select the cell containing the formula you want to copy. Click and drag the fill handle over the cells you want to fill.

The screenshot shows an Excel spreadsheet with the following data:

	B	C	D	E
2				
3		QUANTITY	PRICE PER UNIT	LINE TOTAL
4		15	\$8.75	\$131.25
5		18	\$2.59	
6		9	\$14.25	
7		12	\$2.99	
8				
9				

The formula bar shows $=B4*C4$. A red arrow points to the fill handle in cell D4, which is being dragged down to cell D7.

2. After you release the mouse, the formula will be copied to the selected cells.

The screenshot shows the same Excel spreadsheet as above, but now the formula $=B4*C4$ has been copied to cells D5, D6, and D7. The formula bar still shows $=B4*C4$.

	B	C	D	E
2				
3		QUANTITY	PRICE PER UNIT	LINE TOTAL
4		15	\$8.75	\$131.25
5		18	\$2.59	\$46.62
6		9	\$14.25	\$128.25
7		12	\$2.99	\$35.88
8				
9				

Edit a Formula

Excel

Sometimes you may want to modify an existing formula. In the example below, we've entered an incorrect cell address in our formula, so we'll need to correct it.

1. Select the cell containing the formula you want to edit
2. Click the formula bar to edit the formula. You can also double-click the cell to view and edit the formula directly within the cell.
3. A border will appear around any referenced cells. In our example, we'll change the first part of the formula to reference cell D10 instead of cell D9.
4. When you're finished, press Enter on your keyboard or select the Enter command in the formula bar.
5. The formula will be updated, and the new value will be displayed in the cell.

QUANTITY	PRICE PER UNIT	LINE TOTAL
15	\$8.75	\$131.25
18	\$2.59	\$46.62
9	\$14.25	\$128.25
12	\$2.99	\$35.88
JUNE BUDGET		\$1,200
JULY BUDGET		\$1,500
TOTAL		\$1,500

QUANTITY	PRICE PER UNIT	LINE TOTAL
15	\$8.75	\$131.25
18	\$2.59	\$46.62
9	\$14.25	\$128.25
12	\$2.99	\$35.88
JUNE BUDGET		\$1,200
JULY BUDGET		\$1,500
TOTAL		\$1,500

Sheets

Sometimes you may want to modify an existing formula. In our example, we typed an incorrect cell address in our formula, so we need to correct it.

1. Double-click the cell containing the formula you want to edit. The formula will be displayed in the cell.
2. Make the desired edits to the formula. In our example, we will replace C4 with C5.
3. When you're finished, press the Enter key on your keyboard. The formula recalculates, and the new value displays in the cell.

ITEM	QUANTITY	PRICE PER UNIT	LINE TOTAL
Plastic Silverware (box of 100)	15	\$8.75	\$131.25
Napkins (box of 50)	18	\$2.59	\$46.62
Plates (box of 50)	9	\$14.25	\$128.25
Hot Sauce (gallon bottle)	12	\$2.99	\$35.88
TOTAL			\$1,500

ITEM	QUANTITY	PRICE PER UNIT	LINE TOTAL
Plastic Silverware (box of 100)	15	\$8.75	\$131.25
Napkins (box of 50)	18	\$2.59	\$46.62
Plates (box of 50)	9	\$14.25	\$128.25
Hot Sauce (gallon bottle)	12	\$2.99	\$35.88
TOTAL			\$1,500

Challenge

Excel

1. Open Excel 2016.
2. Enter the following into the designated Cells

A1	10
A2	2
A3	5

3. Use the fill handle to copy the same numbers into cells B1 through B3
4. In cell A4, create a formula that multiplies cells A1 and A2. Be sure to use cell references.
5. In Cell B4, create a formula that adds cells A4 and B3. Be sure to use the cell references

Sheets

1. Open Google Sheets and create a new blank spreadsheet.
2. Enter the following into the designated Cells

A1	10
A2	2
A3	5

3. Use the fill handle to copy the same numbers into cells B1 through B3
4. In cell A4, create a formula that multiplies cells A1 and A2. Be sure to use cell references.
5. In Cell B4, create a formula that adds cells A4 and B3. Be sure to use the cell references

For More Resources:

Microsoft Excel:

<https://edu.gcfglobal.org/en/excel2016/intro-to-formulas/1/>

Google Sheets:

<https://edu.gcfglobal.org/en/googlespreadsheets/creating-simple-formulas/1/>